CRSI

FOUNDED 1924

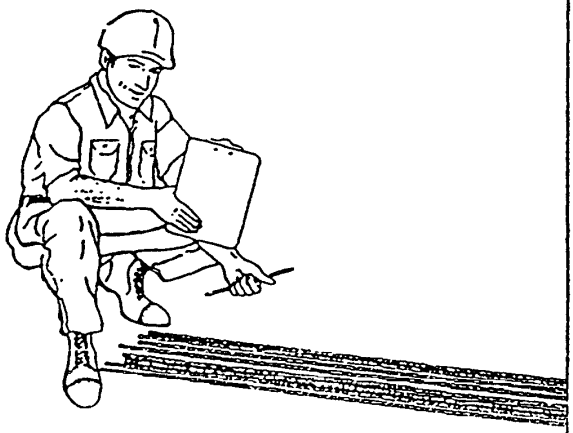
field identification guide for reinforcing bars

CRSI

FOUNDED 1924

CONCRETE REINFORCING STEEL INSTITUTE

field identification guide for reinforcing bars



U.S. MANUFACTURERS OF GRADE 60 [420] CONCRETE REINFORCING BARS

CONTACT INFORMATION FOR CRSI MILL MEMBERS

2. **AMERISTEEL**
Charlotte Steel Mill Division
6601 Lakeview Rd
Charlotte, NC 28213
Tel: (704) 596-0361
Fax: (704) 597-5031
Web: www.ameristeel.com

AMERISTEEL
Jacksonville Steel Mill Division
Hwy 217 & Yellow Water Rd
Baldwin, FL 32234
Tel: (904) 266-4261
Fax: (904) 266-4244
Web: www.ameristeel.com

AMERISTEEL
Knoxville Steel Mill Division
1919 Tennessee Ave
Knoxville, TN 37950
Tel: (865) 546-5472
Fax: (865) 637-8293
Web: www.ameristeel.com

AMERISTEEL
West Tennessee Steel Mill Division
801 AmeriSteel Rd
Jackson, TN 38305
Tel: (901) 424-5600
Fax: (901) 422-4247
Web: www.ameristeel.com

3. **AUBURN STEEL COMPANY, INC.**
Auburn Division
25 Quarry Rd
Auburn, NY 13021
Tel: (315) 253-4561
Fax: (315) 253-5377
Web: www.austeel.com

AUBURN STEEL COMPANY, INC.
Lemont Division
New Ave at Ceco Rd
Lemont, IL 60439
Tel: (630) 243-0012
Fax: (630) 243-0031
Web: www.austeel.com

5. **BIRMINGHAM STEEL CORP.**
Alabama Steel Division
2301 Shuttlesworth Dr
Birmingham, AL 35234
Tel: (205) 252-8777
Fax: (205) 250-7465
Web: www.birminghamsteel.com

BIRMINGHAM STEEL CORP.
Illinois Steel Division, Joliet Rolling Mill
927 Collins
Joliet, IL 60432
Tel: (815) 774-6145
Fax: (815) 774-6105
Web: www.birminghamsteel.com

BIRMINGHAM STEEL CORP.
Illinois Steel Division, Kankakee Plant
972 East 4500 North Rd
Bourbonnais, IL 69014
Tel: (815) 937-3131
Fax: (815) 939-5599
Web: www.birminghamsteel.com

BIRMINGHAM STEEL CORP.
Mississippi Steel Division
3630 Fourth St
Jackson, MS 39208
Tel: (601) 939-1623
Fax: (601) 936-6200
Web: www.birminghamsteel.com

BIRMINGHAM STEEL CORP.
Seattle Washington Steel Division
2424 SW Andover
Seattle, WA 98106
Tel: (206) 933-2222
Fax: (206) 933-2207
Web: www.birminghamsteel.com

7. **CASCADE STEEL ROLLING MILLS, INC.**
3200 NorthEast Highway 99W
McMinnville, OR 97128
Tel: (503) 472-4181
Fax: (503) 434-5739
Web: www.schn.com

13. **MARION STEEL COMPANY**
912 Cheney Ave
Marion, OH 43302
Tel: (740) 383-4011
Fax: (740) 383-6429
Web: www.marionsteel.com

U.S. MANUFACTURERS OF GRADE 60 [420] CONCRETE REINFORCING BARS

CONTACT INFORMATION FOR CRSI MILL MEMBERS

14. NORTH STAR STEEL COMPANY
Beaumont Mill
PO Box 2390
Beaumont, TX 77704
Tel: (409) 768-1211
Fax: (409) 769-1978
Web: www.cargillsteel.com/carnss

NORTH STAR STEEL COMPANY
Kingman Mill
3000 Hwy 66 South
Kingman, AZ 86413
Tel: (520) 718-0119
Fax: (520) 718-7093
Web: www.cargillsteel.com/carnss

NORTH STAR STEEL COMPANY
Monroe Mill
3000 East Front St
Monroe, MI 48161
Tel: (734) 243-2446
Fax: (734) 243-2751
Web: www.cargillsteel.com/carnss

NORTH STAR STEEL COMPANY
St. Paul Mill
1678 Red Rock Rd
St. Paul, MN 55119
Tel: (651) 731-5600
Fax: (651) 731-5699
Web: www.cargillsteel.com/carnss

NORTH STAR STEEL COMPANY
Wilton Mill
Highway 38 Greens Rd
Wilton, IA 52778
Tel: (319) 732-3231
Fax: (319) 732-4575
Web: www.cargillsteel.com/carnss

19. SHEFFIELD STEEL CORP.
2300 South Hwy 97
Sand Springs, OK 74063
Tel: (918) 245-1335
Fax: (918) 245-9343
Web: www.sheffieldsteel.com

21. STRUCTURAL METALS, INC.
Arkansas Mill
PO Box 1147
Magnolia, AR 71753
Tel: (870) 234-8703
Fax: (870) 234-8706
Web: www.steelnet.org/cmc

STRUCTURAL METALS, INC.
South Carolina Mill
310 New State Rd
Cayce, SC 29033
Tel: (803) 936-3700
Fax: (803) 936-3711
Web: www.steelnet.org/cmc

STRUCTURAL METALS, INC.
Texas Mill
PO Box 911
Seguin, TX 78156
Tel: (830) 372-8200
Fax: (830) 379-9873
Web: www.steelnet.org/cmc

22. TAMCO
12459 Arrow Hwy
Rancho Cucamonga, CA 91739
Tel: (909) 899-0660
Fax: (909) 899-1910

MATERIAL SPECIFICATIONS FOR REINFORCING BARS

Identification Marks*—ASTM Standard Rebars

The ASTM specifications for billet-steel, rail-steel, axle-steel and low-alloy reinforcing bars (A615, A616, A617 and A706, respectively) require identification marks to be rolled into the surface of one side of the bar to denote the Producer's mill designation, bar size, type of steel, and minimum yield designation. Grade 60 bars show these marks in the following order.

lst—Producing Mill (usually a letter)
2nd—Bar Size Number (#3 through #11, #14, #18)
3rd—Type of Steel:

S for Billet (A615)
W for Low-Alloy (A706)
I for Rail (A616)
I R for Rail meeting Supplementary Requirements S1 (A616)
A for Axle (A617)

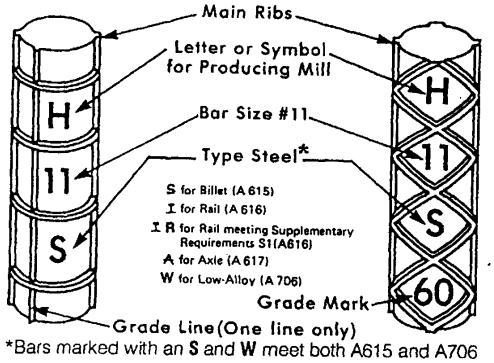
4th—Minimum Yield Designation

Minimum yield designation is used for Grade 60 and Grade 75 bars only. Grade 60 bars can either have one single longitudinal line (grade line) or the number 60 (grade mark). Grade 75 bars can either have two grade lines or the grade mark 75.

A grade line is smaller and is located between the two main ribs which are on opposite sides of all bars made in the United States. A grade line must be continued through at least 5 deformation spaces, and it may be placed on the same side of the bar as the other markings or on the opposite side. A grade mark is the 4th mark on the bar.

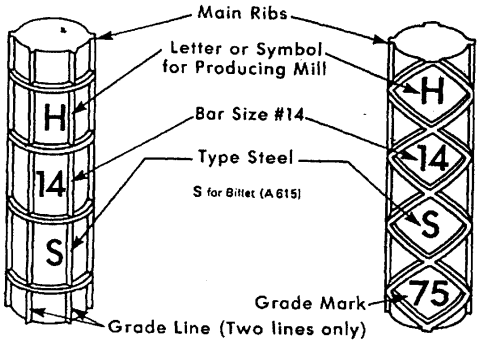
Grade 40 and 50 bars are required to have only the first three identification marks (no minimum yield designation).

VARIATIONS: Bar identification marks may also be oriented to read horizontally (at 90° to those illustrated). Grade mark numbers may be placed within separate consecutive deformation spaces to read vertically or horizontally.

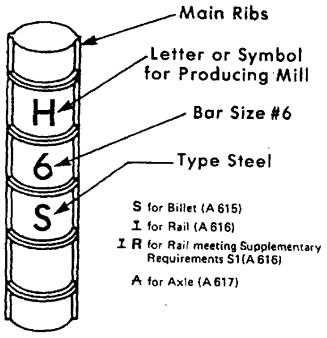


*Bars marked with an **S** and **W** meet both A615 and A706

GRADE 60



GRADE 75



GRADE 40 AND 50

*See Appendix A for complete identification marks of Grade 60 concrete reinforcing bars produced by all U.S. Manufacturers. The marks, listed alphabetically by producing mill, include the identification requirements of ASTM and the deformation pattern used by each mill.

ASTM STANDARD REINFORCING BARS

English Bar Size	Diameter (inches)	Metric Bar Size	Diameter (mm)
#3	0.375	#10	9.5
#4	0.500	#13	12.7
#5	0.625	#16	15.9
#6	0.750	#19	19.1
#7	0.875	#22	22.2
#8	1.000	#25	25.4
#9	1.128	#29	28.7
#10	1.270	#32	32.3
#11	1.410	#36	35.8
#14	1.693	#43	43.0
#18	2.257	#57	57.3

ASTM STANDARD REINFORCING CONVERSION BAR SIZE & GRADE CHARTS

SIZE

English		Metric
#3	=	#10
#4	=	#13
#5	=	#16
#6	=	#19
#7	=	#22
#8	=	#25
#9	=	#29
#10	=	#32
#11	=	#36
#14	=	#43
#18	=	#57

GRADE

English	Metric
Grade 40	300 Mpa
Grade 60	420 MPa
Grade 75	520 MPa

U.S. MANUFACTURERS OF GRADE 60 [420] CONCRETE REINFORCING BARS

ASTM and AASHTO Specifications require that all reinforcing bars be identified by permanent, mill imprinted markings.

1 A.B. STEEL MILL, INC.
(Cincinnati, OH)

S

Bars #3 and #4 only
Grade mark line used for #3 (same side)

1 A.B. STEEL MILL, INC.
(Cincinnati, OH)

S

Bars #5 through #8 only

2 AMERISTEEL CRSI
(Charlotte Steel Mill Division in Charlotte, NC)

S

Bars #13 through #25 only

2 AMERISTEEL CRSI
(Charlotte Steel Mill Division in Charlotte, NC)

W

Bars #13 through #25 only

2 AMERISTEEL CRSI
(Jacksonville Steel Mill Division in Baldwin, FL)

S

Bars #10 through #36 only (#10 through #16 coiled)

2 AMERISTEEL CRSI
(Jacksonville Steel Mill Division in Baldwin, FL)

W

Bars #10 through #36 only (#10 through #16 coiled)

2 AMERISTEEL CRSI
(Knoxville Steel Mill Division in Knoxville, TN)

S

Bars #13 through #36 only

2 AMERISTEEL CRSI
(Knoxville Steel Mill Division in Knoxville, TN)

W

Bars #13 through #36 only

2 AMERISTEEL CRSI
(West Tennessee Steel Mill Division in Jackson, TN)

S

Bars #10 through #36 only

2 AMERISTEEL CRSI
(West Tennessee Steel Mill Division in Jackson, TN)

S

Bars #43 and #57 only

2 AMERISTEEL CRSI
(West Tennessee Steel Mill Division in Jackson, TN)

W

Bars #10 through #36 only

2 AMERISTEEL CRSI
(West Tennessee Steel Mill Division in Jackson, TN)

W

Bars #43 and #57 only

3 AUBURN STEEL COMPANY, INC. CRSI
(Auburn Division in Auburn, NY)

S

Bars #13 through #43 only

3 AUBURN STEEL COMPANY, INC. CRSI
(Auburn Division in Auburn, NY)

W

Bars #13 through #43 only

3 AUBURN STEEL COMPANY, INC. CRSI
(Lemont Division in Lemont, IL)

S

Bars #13 through #36 only

3 AUBURN STEEL COMPANY, INC. CRSI
(Lemont Division in Lemont, IL)

W

Bars #13 through #36 only

4 BAYOU STEEL CORP.
(Harriman, TN)

S

Bars #10 through #36 only

5 BIRMINGHAM STEEL CORP. CRSI
(Alabama Steel Division in Birmingham, AL)

S

Bars #10 through #36 only

Note: CRSI mill members are in boldface with the CRSI logo at the top right corner.

U.S. MANUFACTURERS OF GRADE 60 [420] CONCRETE REINFORCING BARS

ASTM and AASHTO Specifications require that all reinforcing bars be identified by permanent, mill imprinted markings.

5 BIRMINGHAM STEEL CORP. CRSI
(Alabama Steel Division in Birmingham, AL)

W

Bars #10 through #36 only

5 BIRMINGHAM STEEL CORP. CRSI
(Illinois Steel Division, Joliet Rolling Mill in Joliet, IL)

S

Bars #10 through #19 only (#10 through #19 coiled)

5 BIRMINGHAM STEEL CORP. CRSI
(Illinois Steel Division, Joliet Rolling Mill in Joliet, IL)

W

Bars #10 through #19 only (#10 through #19 coiled)

5 BIRMINGHAM STEEL CORP. CRSI
(Illinois Steel Division, Kankakee Plant in Bourbonnais, IL)

S

Bars #10 through #36 only

5 BIRMINGHAM STEEL CORP. CRSI
(Illinois Steel Division, Kankakee Plant in Bourbonnais, IL)

W

Bars #10 through #36 only

5 BIRMINGHAM STEEL CORP. CRSI
(Mississippi Steel Division in Jackson, MS)

S

Bars #13 through #36 only

5 BIRMINGHAM STEEL CORP. CRSI
(Mississippi Steel Division in Jackson, MS)

W

Bars #13 through #36 only

5 BIRMINGHAM STEEL CORP. CRSI
(Seattle Washington Steel Division in Seattle, WA)

S

All bar sizes

5 BIRMINGHAM STEEL CORP. CRSI
(Seattle Washington Steel Division in Seattle, WA)

W

All bar sizes

6 BORDER STEEL, INC.
(El Paso, TX)

S

Bars #10 through #36 only

6 BORDER STEEL, INC.
(El Paso, TX)

S

Bars #43 and #57 only

6 BORDER STEEL, INC.
(El Paso, TX)

W

Bars #10 through #36 only

6 BORDER STEEL, INC.
(El Paso, TX)

W

Bars #43 and #57 only

7 CASCADE STEEL ROLLING MILLS, INC. CRSI
(McMinnville, OR)

S

Bars #10 through #19 only (#10 through #19 coiled)

7 CASCADE STEEL ROLLING MILLS, INC. CRSI
(McMinnville, OR)

S

Bars #16 through #22 only

7 CASCADE STEEL ROLLING MILLS, INC. CRSI
(McMinnville, OR)

S

Bars #25 through #57 only

7 CASCADE STEEL ROLLING MILLS, INC. CRSI
(McMinnville, OR)

W

Bars #13 through #19 only (#13 through #19 coiled)

7 CASCADE STEEL ROLLING MILLS, INC. CRSI
(McMinnville, OR)

W

Bars #16 through #22 only

Note: CRSI mill members are in boldface with the CRSI logo at the top right corner.

U.S. MANUFACTURERS OF GRADE 60 [420] CONCRETE REINFORCING BARS

ASTM and AASHTO Specifications require that all reinforcing bars be identified by permanent, mill imprinted markings.

7 CASCADE STEEL ROLLING MILLS, INC. CRSI
(McMinnville, OR)

W

Bars #25 through #57 only

8 CHICAGO HEIGHTS STEEL
(Chicago Heights, IL)

I

Bars #4 through #8 only

9 CONNECTICUT STEEL CORP.
(Wallingford, CT)

S

Coiled bars #10 and #13 only

10 CO-STEEL RARITAN
(Perth Amboy, NJ)

S

Coiled bars #10 through #19 only

10 CO-STEEL RARITAN
(Perth Amboy, NJ)

W

Coiled bars #10 through #19 only

11 CO-STEEL SAYREVILLE
(Sayreville, NJ)

S

All bar sizes

11 CO-STEEL SAYREVILLE
(Sayreville, NJ)

W

All bar sizes

12 GST STEEL COMPANY
(Kansas City, MO)

S

Coiled bars #3 and #4 only

12 GST STEEL COMPANY
(Kansas City, MO)

W

Coiled bars #3 and #4 only

13 MARION STEEL COMPANY CRSI
(Marion, OH)

S

Bars #13 through #36 only
Grade mark line opposite side, "I" may be under "S" for #13 or #16

13 MARION STEEL COMPANY CRSI
(Marion, OH)

W

Bars #13 through #36 only
Grade mark line on opposite side

14 NORTH STAR STEEL COMPANY CRSI
(Beaumont Mill in Beaumont, TX)

S

Coiled bars #10 through #16 only

14 NORTH STAR STEEL COMPANY CRSI
(Kingman Mill in Kingman, AZ)

S

All bar sizes (#10 through #16 coiled)

14 NORTH STAR STEEL COMPANY CRSI
(Kingman Mill in Kingman, AZ)

W

Bars #10 through #36 only (#10 through #16 coiled)

14 NORTH STAR STEEL COMPANY CRSI
(Monroe Mill in Monroe, MI)

S

Bar #13 only
Grade mark line on opposite side

14 NORTH STAR STEEL COMPANY CRSI
(Monroe Mill in Monroe, MI)

W

Bar #13 only
Grade mark line on opposite side

14 NORTH STAR STEEL COMPANY CRSI
(St. Paul Mill in St. Paul, MN)

S

Bars #13 through #36 only
Grade mark line on opposite side

14 NORTH STAR STEEL COMPANY CRSI
(St. Paul Mill in St. Paul, MN)

S

Bars #43 and #57 only
Grade mark line on opposite side

Note: CRSI mill members are in boldface with the CRSI logo at the top right corner.

U.S. MANUFACTURERS OF GRADE 60 [420] CONCRETE REINFORCING BARS

ASTM and AASHTO Specifications require that all reinforcing bars be identified by permanent, mill imprinted markings.

14 NORTH STAR STEEL COMPANY **CRSI**
(St. Paul Mill in St. Paul, MN)

W

Bars #13 through #36 only
Grade mark line on opposite side

14 NORTH STAR STEEL COMPANY **CRSI**
(St. Paul Mill in St. Paul, MN)

W

Bars #43 and #57 only
Grade mark line on opposite side

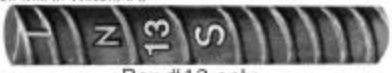
14 NORTH STAR STEEL COMPANY **CRSI**
(St. Paul Mill in St. Paul, MN)

S

Bars #19 through #57 (Patented)
Long. groove one side only, marking system not per ASTM

14 NORTH STAR STEEL COMPANY **CRSI**
(Wilton Mill in Wilton, IA)

S



Bar #13 only
Grade mark line on opposite side - "I" is first mark (shown) or under S

15 NORTHWESTERN STEEL & WIRE CO.
(Sterling, IL)

S

Coiled bars #10 through #16 only
Inch-pound markings on opposite side

15 NORTHWESTERN STEEL & WIRE CO.
(Sterling, IL)

S

Coiled bars #10 through #16 only
Inch-pound markings on opposite side

16 NUCOR STEEL
(South Carolina Mill in Darlington, SC)

S

Bars #13 through #19 only (#16 coiled)

16 NUCOR STEEL
(South Carolina Mill in Darlington, SC)

S

Bars #22 through #36 only

16 NUCOR STEEL
(Texas Mill in Jewett, TX)

S

Bars #10 through #36 only

16 NUCOR STEEL
(Utah Mill in Plymouth, UT)

S

Bars #10 through #25 only (#10 through #16 coiled)

16 NUCOR STEEL
(Utah Mill in Plymouth, UT)

S

Bars #19 through #25 only

16 NUCOR STEEL
(Utah Mill in Plymouth, UT)

S

Bars #19 through #36 only

16 NUCOR STEEL
(Utah Mill in Plymouth, UT)

S

Bars #43 and #57 only

16 NUCOR STEEL
(Utah Mill in Plymouth, UT)

W

Bars #10 through #25 only (#13 and #16 coiled)

16 NUCOR STEEL
(Utah Mill in Plymouth, UT)

W

Bars #19 through #36 only

17 RIVERVIEW STEEL CORP.
(Glassport, PA)

S

Bars #10 through #19 only

18 ROCKY MOUNTAIN STEEL MILLS
(Pueblo, CO)

S

Coiled bars #3 through #5 only

18 ROCKY MOUNTAIN STEEL MILLS
(Pueblo, CO)

S

Coiled bars #3 through #7 only

Note: CRSI mill members are in boldface with the CRSI logo at the top right corner.

U.S. MANUFACTURERS OF GRADE 60 [420] CONCRETE REINFORCING BARS

ASTM and AASHTO Specifications require that all reinforcing bars be identified by permanent, mill imprinted markings.

18 ROCKY MOUNTAIN STEEL MILLS
(Pueblo, CO)

W

Coiled bars #3 through #5 only

18 ROCKY MOUNTAIN STEEL MILLS
(Pueblo, CO)

W

Coiled bars #3 through #7 only

19 SHEFFIELD STEEL **CRSI**
(Sand Springs, OK)

S

Bars #13 through #43 only

20 SILVER, INC., W.
(El Paso, TX)

I

Bar #3 only

20 SILVER, INC., W.
(El Paso, TX)

I

Bar #3 only

20 SILVER, INC., W.
(El Paso, TX)

I

Bar #3 only
Grade mark line on opposite side

21 STRUCTURAL METALS, INC. **CRSI**
(Arkansas Mill in Magnolia, AR)

S

Bars #10 through #19 only

21 STRUCTURAL METALS, INC. **CRSI**
(Arkansas Mill in Magnolia, AR)

I

Bars #10 through #19 only

21 STRUCTURAL METALS, INC. **CRSI**
(South Carolina Mill in Cayce, SC)

S

Bars #10 through #36 only

21 STRUCTURAL METALS, INC. **CRSI**
(South Carolina Mill in Cayce, SC)

S

Bars #43 and #57 only

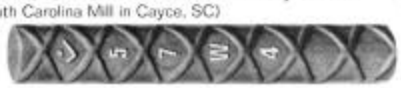
21 STRUCTURAL METALS, INC. **CRSI**
(South Carolina Mill in Cayce, SC)

W

Bars #10 through #36 only

21 STRUCTURAL METALS, INC. **CRSI**
(South Carolina Mill in Cayce, SC)

W



Bars #43 and #57 only

21 STRUCTURAL METALS, INC. **CRSI**
(Texas Mill in Seguin, TX)

S

Bars #10 through #36 only

21 STRUCTURAL METALS, INC. **CRSI**
(Texas Mill in Seguin, TX)

S

Bars #43 and #57 only

21 STRUCTURAL METALS, INC. **CRSI**
(Texas Mill in Seguin, TX)

W

Bars #10 through #36 only

21 STRUCTURAL METALS, INC. **CRSI**
(Texas Mill in Seguin, TX)

W

Bars #43 and #57 only

22 TAMCO **CRSI**
(Rancho Cucamonga, CA)

S

Bars #13 through #36 only

22 TAMCO **CRSI**
(Rancho Cucamonga, CA)

S

Bars #43 and #57 only

Note: CRSI mill members are in boldface with the CRSI logo at the top right corner.

U.S. MANUFACTURERS OF GRADE 60 [420] CONCRETE REINFORCING BARS

ASTM and AASHTO Specifications require that all reinforcing bars be identified by permanent, mill imprinted markings.

22 TAMCO CRSI
(Rancho Cucamonga, CA)

W 

Bars #13 through #36 only

22 TAMCO CRSI
(Rancho Cucamonga, CA)

W 

Bars #43 and #57 only

23 TXI CHAPARRAL STEEL
(Midlothian, TX)

S 

Bars #10 through #36 only
Grade mark line on opposite side

23 TXI CHAPARRAL STEEL
(Midlothian, TX)

W 

Bars #10 through #36 only
Grade mark line on opposite side

Note: CRSI mill members are in boldface with the CRSI logo at the top right corner.

MATERIAL SPECIFICATIONS FOR REINFORCING BARS

TABLE 1—MECHANICAL REQUIREMENTS FOR STANDARD ASTM DEFORMED REINFORCING BARS*

Type of Steel and ASTM Designation	Bar Nos. Range	Grade[1]	Minimum[2] Yield Strength, psi	Minimum Tensile Strength, psi	Minimum Percentage Elongation in 8 in.	Cold Bend Test[3] Pin Diameter (*d*=nominal diameter of specimen)
Billet-Steel A615	3-6	40	40,000	70,000	#3 . . . . . 11 #4, #5, #6 12	#3, #4, #5 . . . . . 3½*d* #6 . . . . . 5*d*
	3-11, 14, 18	60	60,000	90,000	#3, #4, #5, #6 . . . . . 9 #7, #8 . . . . . 8 #9, #10, #11, #14, #18. . . . 7	#3, #4, #5 . . . . . 3½*d* #6, #7, #8 . . . . . 5*d* #9, #10, #11 . . . . . 7*d* #14, #18 (90°). 9*d*
	6-11, 14, 18	75	75,000	100,000	#6, #7, #8 . . . . . 7 #9, #10, #11, #14, #18. . . . 6	#6, #7, #8 . . . . . 5*d* #9, #10, #11 . . . . . 7*d* #14, #18 (90°). 9*d*
Low-Alloy Steel A706	3-11, 14, 18	60	60,000[4]	80,000[5]	#3, #4, #5, #6 . . . . . 14 #7, #8, #9, #10, #11 . . . . . 12 #14, #18 10	#3, #4, #5 . . . . . 3*d* #6, #7, #8 . . . . . 4*d* #9, #10, #11 . . . . . 6*d* #14, #18 . . . . . 8*d*

[1] Minimum yield designation.
[2] Yield point or yield strength. See ASTM specifications.
[3] Test bends 180° unless noted otherwise.
[4] Maximum yield strength 78,000 psi (ASTM A706 only).
[5] Tensile strength shall not be less than 1.25 times the actual yield strength (ASTM A706 only).
* For the mechanical requirements of rail-steel and axle-steel bars, see ASTM specifications A616 and A617, respectively.

TABLE 2—DEFORMATION REQUIREMENTS FOR STANDARD ASTM DEFORMED REINFORCING BARS

Size No.	Maximum Average Spacing, in.	Minimum Average Height, in.	Maximum[1] Gap, in.
3	0.262	0.015	0.143
4	0.350	0.020	0.191
5	0.437	0.028	0.239
6	0.525	0.038	0.286
7	0.612	0.044	0.334
8	0.700	0.050	0.383
9	0.790	0.056	0.431
10	0.889	0.064	0.487
11	0.987	0.071	0.540
14	1.185	0.085	0.648
18	1.58	0.102	0.864

[1] Chord of 12.5% of nominal perimeter

TABLE 3—CHEMICAL COMPOSITION REQUIREMENTS FOR STANDARD ASTM DEFORMED REINFORCING BARS

Type of Steel and ASTM Designation	Condition*	Element									
		Carbon (C)	Manganese (Mn)	Phosphorus (P)	Sulfur (S)	Silicon (Si)	Copper (Cu)	Nickel (Ni)	Chromium (Cr)	Molybdenum (Mo)	Vanadium (V)
Billet-Steel A615	1	X	X	X	X						
	2			0.06%							
	3			0.075%							
Low-Alloy Steel A706	1	X	X	X	X	X	X	X	X	X	X
	2	0.30%	1.50%	0.035%	0.045%	0.50%					
	3	0.33%	1.56%	0.043%	0.053%	0.55%					

*CONDITION DEFINITIONS: 1 Analysis required of these elements for each heat.
2 Maximum allowable chemical content for each heat.
3 Maximum allowable chemical content for finished bar.